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Promotion Effect of Iodine Treatment on Carbonization of Polymer Films for MEMS Chips

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In this paper we describe the promotion effect of iodine treatment on the carbonization of polymers at a low pyrolysis temperature for micro electromechanical systems (MEMS) and micro total analysis systems (μTAS) applications. A higher pyrolysis temperature contributes to further carbonization. There is, however, a restriction of process temperature when applying pyrolyzed polymers to MEMS chips. We propose a unique technique for synthesizing pyrolyzed polymers to overcome this restriction. Through electrical and structural characterizations, it is confirmed that iodine treatment promotes further carbonization. The resistivity of a parylene C film was 2.0 Ωcm after 12 h of iodine treatment followed by pyrolysis at 650°C, but only 3.4×10^3 Ωcm without iodine treatment. Furthermore, we present the potential of the proposed technique for electrochemical electrode applications.

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